New Radio Steals Its Power from the Air

Nearby station can furnish power . . . to receive a distant station

Invention of "telepower" will give broadcast waves striking new jobs to do

FOR the past three years a radio in the attic of a suburban Washington home has been driving a 12" loudspeaker 24 hours a day without using house current, batteries or solar energy. It gets free power from the air waves.

There are two independent circuits in the receiver: one to pick up the signal you hear, the other to extract from the atmosphere the tiny amount of power required by the receiver's transistors. The power circuit captures some of the electrical energy coming from radio or TV broadcasting sta-

A TELEPOWER RECEIVER YOU CAN BUILD

HERE is a circuit to start you on your own experiments with telepower. It is designed for headphone operation on the broadcast band and gets its operating power from a local broadcast transmitter.

Circuit No. 1 on the diagram is the radio receiver using a crystal diode, D1, for the detector and a PNP transistor as an amplifier. The antenna is coupled to the tuning coil, L1, by three turns of insulated wire wound on the top end of the coil. This same wire continues to circuit No. 2, the telepower circuit, where it is coupled to a second tuning coil, L2, through a trimmer condenser, C2.

The diode, D2, rectifies the incoming radio-frequency energy, and the resulting DC is stored in condenser C3 which serves as the battery for the transistor amplifier in circuit No. 1.

When the receiver is wired, connect the antenna, ground and headphones. Antenna should be about 50 feet long, and high above the ground. Headphones should be magnetic type with at least 2,000-ohm impedance.

To adjust the receiver:

1. Temporarily connect 1½-volt flashlight battery across C3 with positive terminal to the ground.
2. Tune circuit No. 1 by turning the threaded shaft in L1 until the strongest station is heard.
3. Leave set tuned to the strongest station and remove the battery.
4. With the headset still on, adjust C2 and L2 until you hear the signal loudest. A voltmeter (three-volt scale) connected across C3 will give you a more accurate indication of peak-power adjustment.

This completes the adjustment of the telepower part of the circuit. No future adjustment of this circuit will be needed unless the antenna or location is changed.

5. Now complete the adjustment of circuit No. 1 by screwing the slug in L1 all the way in and adjusting C1 to bring in the lowest-frequency station on the dial. This adjustment is to assure maximum coverage of the broadcast band.

To get any AM broadcast within range of your receiver, after the initial adjust-

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tions, changes it to DC and stores it in a condenser, which then acts as a battery. Up to eight volts has been maintained across the condenser with the power circuit tuned to a nearby TV transmitter. While this set can tune in the program from any AM broadcasting station within range, it gets the operating voltages for its transistors from the local TV station.

This is a deluxe version of an invention by Lloyd R. Crump, an electronics specialist at the Army's Diamond Fuze Laboratories. He has coined the word "telepower" for his patented principle of powering electrical devices with energy captured from the air.

To demonstrate the practicality of his idea, Crump has designed the simple broadcast receiver described below.

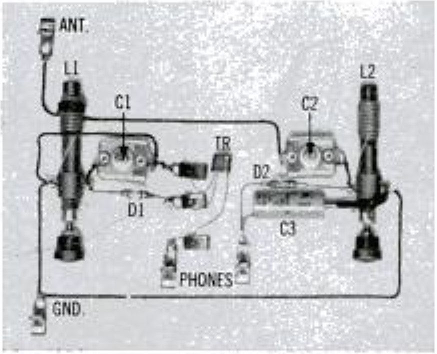
You can easily build it yourself from standard radio parts, or you can get a kit of parts from the inventor for $6.50. (L. R. Crump, 12108 Atherton Drive, Silver Spring, Md.)

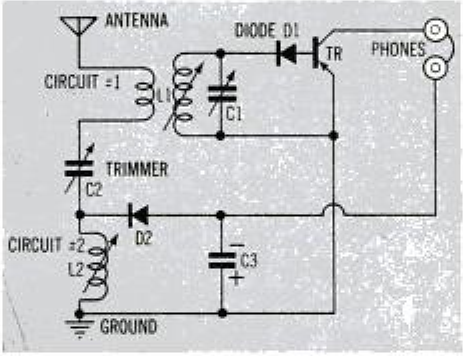
But entertainment is only a sidelight to the more important uses to which the invention can be put. The principle can also be used to power miniature transmitters. This promises a host of valuable applications. Since there is no power supply to deteriorate with age, such a transmitter could be planted as a location marker that would send out its telltale signal every time it was excited by the transmitters in passing airplanes or ships. It could be concealed as a listening device that an operator at a remote location could energize at any time and then listen to. The cloak-and-dagger possibilities are obvious.

As a remote-switching device that would be continuously alert, it could set off explosives, turn beacon lights or warning signals off or on, or operate a garage door's opening apparatus.

Fixed-tuned receivers powered by a central transmitter could call emergency crews, act as civil-defense alarms, or be used as office intercoms.

This whole field of inquiry is brand new. The most valuable applications may come from experimenters and hobbyists working with the basic principle. Further research, coupled with development of special circuit components, will, Crump says, extend the horizons far beyond present applications.—*Hubert Luckett.*





ment is finished, all you have to do is screw the slug in or out of L1.

The antenna needed will vary with station power, distance and other factors. As a general rule the longer and higher, the better. But this set has operated at overload volume with only a three-foot wire for an antenna, one mile from a small (500-watt) station.

Parts List:

L1, L2: High-Q, ferrite core, broadcast-band antenna coil with knobs

D1, D2: IN34A crystal diodes

TR: PNP (Ck 721 or 2N77) transistor

C1, C2: 5 180-mfd. trimmer condensers

C3: 10-mfd. low-voltage electrolytic condenser

Headphones: 2,000-ohm magnetic

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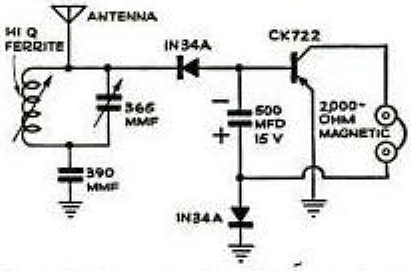
. . . I built your telepower receiver and it worked very well. But after some experimenting, I think I have come up with a circuit that works equally well and is less expensive to build. As shown on the schematic, I used a Ck 722 instead of the Ck 721 transistor you specified.



E. F. Schmidt, Springfield, Mo.

Here's a field that's wide open for kitchen-table experimenters. Have any other readers done anything interesting with telepower?